

CLAIMS

We claim:

1. A polymer blend, comprising:
 - (A) about 50 to about 99 weight percent (wt%) of an aliphatic-aromatic random copolyester (AAPE); and
 - (B) about 1 to about 50 wt% of a poly(ethylene-co-vinyl acetate) copolymer (EVAc),wherein said blend has a melt index less than the melt index of said AAPE, as determined by ASTM Method D-1238, and said weight percentages are based on the total weight of said blend.
2. The blend according to claim 1 wherein said AAPE comprises
 - (A) diol residues comprising the residues of one or more substituted or unsubstituted, linear or branched, diols selected from aliphatic diols containing 2 to about 8 carbon atoms, polyalkylene ether glycols containing 2 to 8 carbon atoms, and cycloaliphatic diols containing about 4 to about 12 carbon atoms, wherein said substituted diols contain 1 to about 4 substituents independently selected from halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy; and
 - (B) diacid residues comprising
 - (i) about 35 to about 99 mole%, based on the total moles of diacid residues, of the residues of one or more substituted or unsubstituted, linear or branched, non-aromatic dicarboxylic acids selected from aliphatic dicarboxylic acids containing 2 to about 12 carbon atoms and cycloaliphatic dicarboxylic acids containing about 5 to about 10 carbon atoms, wherein said substituted non-aromatic dicarboxylic acids contain 1 to about 4 substituents selected from halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy; and
 - (ii) about 1 to about 65 mole%, based on the total moles of diacid residues, of the residues of one or more substituted or unsubstituted aromatic dicarboxylic acids containing 6 to about 10 carbon

atoms, wherein said substituted aromatic dicarboxylic acids contain 1 to about 4 substituents selected from halo, C₆-C₁₀ aryl, and C₁-C₄ alkoxy.

3. The blend according to claim 2 wherein said non-aromatic dicarboxylic acids comprise one or more dicarboxylic acids selected from glutaric acid, diglycolic acid, succinic acid, adipic acid, and 1,4- cyclohexanedicarboxylic acid; and said aromatic dicarboxylic acids comprise one or more dicarboxylic acids selected from terephthalic acid, isophthalic acid, salts of 5-sulfoisophthalic acid, and 2,6-naphthalenedicarboxylic acid.
4. The blend according to claim 3 wherein said diols comprise one or more diols selected from: 1,4-butanediol; 1,3-propanediol; ethylene glycol; 1,6-hexanediol; diethylene glycol; and 1,4-cyclohexanedimethanol.
5. The blend according to claim 4 wherein said EVAc has a melt index less than the melt index of said AAPE, as determined by ASTM method D-1238, at processing temperatures.
6. The blend according to claim 5 wherein said EVAc comprises about 4 to about 40 wt%, based on the total weight of said EVAc, vinyl acetate and has a melt index of about 0.1 to about 30 g/10 minutes at 190°C at 2.16 kg as determined by ASTM method D-1238.
7. The blend according to claim 6 wherein said non-aromatic dicarboxylic acids comprise adipic acid; said aromatic dicarboxylic acids comprise terephthalic acid; and said diols comprise 1,4-butanediol.
8. The blend according to claim 6 further comprising 0 to about 2 mole%, based on the total moles of acid or diol residues, of the residues of one or more branching agents selected from tartaric acid, citric acid, malic acid, 1,3,5-benzenetricarboxylic acid, pentaerythritol, dipentaerythritol, trimethylolpropane, tri-

methylolethane, polyethertriols, glycerol, trimesic acid, trimellitic acid, trimellitic anhydride, pyromellitic acid, pyromellitic anhydride, 4-carboxyphthalic anhydride, and hydroxyisophthalic acid.

9. The blend according to claim 8 further comprising 0 to about 5 wt%, based on the total weight of said blend, of one or more chain extenders selected from toluene 2,4-diisocyanate, toluene 2,6-diisocyanate, 2,4'-diphenylmethane diisocyanate, naphthylene-1,5-diisocyanate, xylylene diisocyanate, hexamethylene diisocyanate, isophorone diisocyanate and methylenebis(2-isocyanatocyclohexane).
10. A polymer blend, comprising:
 - (A) about 50 to about 98 weight percent (wt%), based on the total weight of said blend, of an aliphatic-aromatic random copolyester comprising
 - (a) diol residues comprising the residues of one or more of: 1,4-butanediol; 1,3-propanediol; ethylene glycol; 1,6-hexanediol; diethylene glycol; or 1,4-cyclohexanedimethanol; and
 - (b) diacid residues comprising
 - (i) about 35 to about 95 mole%, based on the total moles of diacid residues, of the residues of one or more non-aromatic dicarboxylic acids selected from glutaric acid, diglycolic acid, succinic acid, 1,4-cyclohexanedicarboxylic acid, and adipic acid; and
 - (ii) about 5 to about 65 mole%, based on the total moles of diacid residues, of the residues of one or more aromatic dicarboxylic acids selected from terephthalic acid and isophthalic acid;
 - (B) about 1 to about 20 wt%, based on the total weight of said blend, of an EVAc comprising about 4 to about 30 wt%, based on the total weight of said EVAc, of the residues of vinyl acetate; and
 - (C) about 1 to about 40 wt%, based on the total weight of said blend, of a biodegradable additive,

wherein said blend has a melt index less than the melt index of said AAPE, as determined by ASTM Method D-1238.

11. The blend according to claim 10 wherein said biodegradable additive comprises one or more of: thermoplastic starch, microcrystalline cellulose, polylactic acid, polyhydroxybutyrate, or polyvinyl alcohol.
12. The blend according to claim 10 or 11 wherein said diols comprise 1,4-butanediol; said non-aromatic dicarboxylic acids comprise adipic acid; and said aromatic dicarboxylic acids comprise terephthalic acid.
13. The blend according to claim 11 wherein said EVAc has a melt index less than the melt index of said AAPE at processing temperatures as determined by ASTM Method D-1238.
14. The blend according to claim 11 further comprising 0 to about 30 wt% of one or more processing aids selected from calcium carbonate, talc, clay, mica, wollastonite, kaolin, diatomaceous earth, TiO_2 , NH_4Cl , silica, calcium oxide, sodium sulfate, and calcium phosphate.
15. The blend according to claim 14 wherein said processing aid is also a biodegradation accelerant.
16. The blend according to claim 15 wherein said processing aid is calcium carbonate.
17. A shaped article comprising the polymer blend of claim 6 or 11.
18. The shaped article according to claim 17 wherein said article comprises a film, a fibrous object, an extruded object, or a molded object.
19. The shaped article according to claim 18 wherein said article is biodistintegratable as determined by DIN Standard 54900.

20. The shaped article according to claim 19 wherein said article is biodegradable as determined by ASTM Standard Method 6340-98.
21. The shaped article according to claim 20 wherein said article is a cast, blown, calendered, or extruded film.
22. The shaped article of claim 21 wherein said article is a bag.
23. The shaped article of claim 20 wherein said fibrous object comprises one or more of: a yarn, a fabric, a melt blown web, a spunbonded web, or a nonwoven fabric.
24. The shaped article of claim 23 wherein said fibrous object comprises one or more layers of fibers.
25. The shaped article of claim 24 wherein said fibrous object comprises one or more objects selected from: wipes, gauzes, tissues, diapers, fiber-containing cleaning products, laminating binders, sanitary napkins, panty liners, tampon, training pants, incontinent products, bandages, or surgical dressings.
26. A process for a polymer blend, comprising blending at a high shear rate,
 - (A) about 50 to about 98 weight percent (wt%), based on the total weight of said blend, of an aliphatic-aromatic random copolyester comprising
 - (a) diol residues comprising the residues of one or more of: 1,4-butanediol; 1,3-propanediol; ethylene glycol; 1,6-hexanediol; diethylene glycol; or 1,4-cyclohexanedimethanol; and
 - (b) diacid residues comprising
 - (i) about 35 to about 95 mole%, based on the total moles of diacid residues, of the residues of one or more non-aromatic dicarboxylic acids selected from glutaric acid, diglycolic acid, succinic acid, 1,4-cyclohexanedicarboxylic acid, and adipic acid; and

- (ii) about 5 to about 65 mole%, based on the total moles of diacid residues, of the residues of one or more aromatic dicarboxylic acids selected from terephthalic acid and isophthalic acid;
 - (B) about 1 to about 20 wt%, based on the total weight of said blend, of an EVAc comprising about 4 to about 30 wt%, based on the total weight of said EVAc, of the residues of vinyl acetate; and
 - (C) 1 to about 40 wt% of a biodegradable additive,
- wherein said blend has a melt index less than the melt index of said AAPE, as determined by ASTM Method D-1238.
27. The process according to claim 26 wherein said biodegradable additive comprises one or more of: thermoplastic starch, microcrystalline cellulose, polylactic acid, polyhydroxybutyrate, or polyvinyl alcohol.
28. A process for increasing the melt-strength of an AAPE comprising blending at a high shear rate,
- (A) about 50 to about 99 weight percent (wt%) of an aliphatic-aromatic random copolyester (AAPE); and
 - (B) about 1 to about 50 wt% of an EVAc having a melt index less than the melt index of said AAPE at processing temperatures,
- wherein said blend has a melt index less than the melt index of said AAPE, as determined by ASTM Method D-1238, and said weight percentages are based on the total weight of said blend.